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ABSTRACT

This practicum report describes an instructional program designed to increase teacher awareness of the technological applications of musical instrument digital interface (MIDI) in the classroom. The primary goal of the study was to assist music teachers in becoming more informed about MIDI, and to enable them to effectively select the appropriate computer hardware and software for their instructional settings. After the acquisition of the current versions of MIDI compatible software, five training sessions were designed in which teachers could develop skills while previewing the software programs. The training session topics included an overview of MIDI, an introduction to MIDI compatible music sequencing software, an introduction to MIDI compatible music notation software, an introduction to MIDI compatible music instructional software, and a discussion of amplification and sound reinforcement. Results of a questionnaire completed by participating music teachers indicated that they had accomplished the following: (1) gained knowledge of the components used in a MIDI network system; (2) gained proficiency in the operations of MIDI compatible music sequencing, notation, and instructional software; and (3) gained knowledge about current music software programs. In addition, participants requested more in-depth training on MIDI programs. It is recommended that continuing staff development efforts for music teachers be offered using MIDI compatible software. Appendices contain the questionnaire used in the study, workshop planning forms, a list of software producers, and other documentation. (56 references) (Author/DB)

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USING MIDI: A STAFF DEVELOPMENT PROGRAM DESIGNED TO INCREASE TEACHER AWARENESS OF THE TECHNOLOGICAL APPLICATIONS OF MUSICAL INSTRUMENT DIGITAL INTERFACE IN THE CLASSROOM

by

Charles Glen Neese

Cluster 37

A Practicum I Report Presented to the Ed.D Program in Child and Youth Studies in Partial Fulfillment of the Requirements for the Degree of Doctor of Education

NOVA UNIVERSITY

1991

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PRACTICUM APPROVAL SHEET

This Practicum took place as described.

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This practicum report was submitted by Charles Glen Neese under the direction of Mary Ellen Sapp, Ph.D.. It was submitted to the Ed.D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at NOVA University.

Approved:

Sept 3 1991
Date of Final Approval of Report

Mary Ellen Sapp
Mary Ellen Sapp, Ph.D., Adviser

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ABSTRACT

Using MIDI: A Staff Development Program Designed To Increase Teacher Awareness Of The Technological Applications Of Musical Instrument Digital Interface In The Classroom 1991: Practicum I Report, Nova University, Ed.D Program in Child And Youth Studies. Descriptors: Music/Music Education/ Staff Development/Computer Software Selection/Computer-Assisted Instruction/Technology

This practicum was designed to increase teacher awareness of the technological applications of musical instrument digital interface in the classroom (MIDI). The primary goal was to assist music teachers in becoming more informed about MIDI to enable them to effectively select the appropriate hardware and software for their instructional settings.

Based on a survey completed by music teachers in the school district, the writer implemented a practicum which involved contacting software developers to acquire current versions of MIDI compatible software, and designing five training sessions in which teachers could develop skills while previewing the software programs.
The topics included: (a) overview of MIDI, hardware and software; (b) introduction to MIDI compatible music sequencing software; (c) introduction to MIDI compatible music notation software; (d) introduction to MIDI compatible music instructional software, and (e) discussion of amplification and sound reinforcement.

The results of the practicum were positive. All four objectives were accomplished. The responses on a post questionnaire indicated that the participants had accomplished the following: (a) gained knowledge of the components used in a MIDI network system; (b) gained proficiency in the operations of MIDI compatible music sequencing, notation, and instructional software, and (c) gained knowledge about current music software programs. In addition the participants wanted more in-depth training on MIDI music sequencing/notation/instructional programs.

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CHAPTER I

INTRODUCTION

Description of the Community

This practicum was conducted in a county which consists of a population of about 142,000 residents, according to the 1990 census figures. Most residents are employed either by the two large Air Force bases which are located in the community or the many smaller defense related industries that contract with the Air Force. Other industries include tourism and fishing.

As with most communities that are predominantly military, a majority of the residents are considered middle or upper class with an average annual income of about $27,000. There are four university extensions in the community that offer a wide array of technical and educational programs but historically none have offered any type of continuing eduction for music educators.

Description of the Setting

The school system is comprised of 21 elementary and 12 secondary schools, serving about 25,000 students. Each elementary school has one music teacher while some middle

and secondary schools have as many as 3 to 4 band and chorus instructors on staff. A director of fine arts, along with 50 music teachers who are certified and degreed, make up the music education department for the district.

In the middle and high schools, the band and choral programs are very popular and enjoy large memberships in their organizations. These groups have an infrastructure of solid financial support generated by active parental and community organizations. Music instructors have acknowledged that students would receive more instruction time in music skills and fundamentals it were not for the increased pressure of preparing for district contest and other performances. With the county's recent successful transition from a junior high to middle school concept, this trend may be reversing.

At the elementary school level, the music teacher is responsible for providing positive learning experiences that will enable children to gain musical knowledge, skills, and attitudes (State of Florida, 1990). Because most of the elementary schools have enrollments of 500 to 600 students, while three schools have as many as 700, the music teacher must accomplish this with children receiving only 20 to 40 minutes of music instruction each week.

Several music teachers have recently begun using the computer as an instructional aid but most are still dependent on the use of instructional materials such as

music textbooks, charts, filmstrips, video tapes, ditto sheets and other types of visuals when presenting musical concepts. Although the elementary music teacher has the privilege of teaching every child in the school, most do not have a budget that will adequately meet all their current instructional needs.

Faced with the increased pressure to have performing groups of bells, recorders, or fluteophones, as well as large musical productions, music teachers have had to continually search for more efficient ways of teaching music theory and fundamentals. Recently, teachers have begun looking to the computer as a possibility for delivering music instruction.

With the recent creation of an instructional technology department in the school system, the availability of microcomputers for music teachers is becoming a reality. Through a prodigious effort from this department, more grant money and state-matching funds for technology have become available, which has resulted in many music teachers recently acquiring a computer.

There is evidence of some recent financial and logistical support for improvement in music technology by the district office administration. Because each music program is unique, music teachers were given release time to visit other music programs in order to gather new ideas. Also, they were recently given release time to work

collectively on a technology related project involving the composition of a county-wide songbook.

Using a MIDI (musical instrument digital interface) compatible music notation program, all elementary music teachers engaged in a guided, hands on activity in which they worked together to comprise a book of traditional songs. The notes and lyrics of each song were entered into a single computer from a MIDI compatible electronic keyboard instrument by way of a MIDI interface. The music was then printed out using a printer with standard computer paper. This exercise, for most music teachers, constituted the first real experience in the use of computers as well as MIDI technology.

Although there was a great deal of enthusiasm during this experience, several observations were made by the writer. First, most teachers exhibited high levels of anxiety at the prospect of working with the computer. Second, those few teachers who had some prior computer experience were the ones called upon to do the actual inputting of notes and operating the program. And third, because there was little introduction to the software program being used, and insufficient time in one session to become proficient, many teachers felt left behind.

Writer's Background and Role

The writer of this practicum has taught elementary

music in the present school system for the past 13 years. The school at which the writer is located is a kindergarten through 5th grade elementary school with an enrollment of approximately 520 students. The major goal of the music program is to provide positive experiences that allow children to succeed in, develop an appreciation of and enjoy music. The writer also has a background as a teacher trainer in music technology. He has in recent years conducted workshops related to digital electronic keyboards as well as earlier workshops concerning analog synthesizers. He has had much experience as a professional musician who has used MIDI technology extensively in performance situations. Additionally, the writer has worked as a consultant in reviewing digital sampling programs for various software producers.

CHAPTER TWO

STUDY OF THE PROBLEM

Description of the Problem

A needs assessment for music staff development is conducted at the beginning and end of the year at a district wide meeting of all music teachers. In the past, this has been accomplished by a group consensus during discussions. Music technology has been an area in which music teachers have repeatedly indicated that more training is needed. Staff development programs in music have been fragmented because of the wide range of subject areas that inservice training must attempt to address. Music inservice training activities in the district for the past few years have included only two technology-related workshops.

One workshop, given in 1987, was conducted to assist music teachers with using the digital electronic synthesizer. This innovation in digital electronics was welcomed by music teachers because of its affordable and portable means to provide new hi-tech sounds as well as the most realist representation of traditional instruments with the punch of a button (rather than the manipulation of many switches and dials of earlier analog synthesizers). The

most recent workshop was conducted to assist music teachers in the use of data base, word processing, and curriculum development software.

Because of the schedule and responsibilities that are inherent in maintaining a music program, teachers have not been willing to attend conferences related to music technology that would require being absent from work. They have instead asked that new technological innovations be presented using hands-on training sessions conducted locally by teachers rather than outside consultants. Although little training has been provided in music technology, the school district has been the key provider.

During recent district meetings, many elementary teachers expressed to the writer an interest in utilizing MIDI software programs that could improve their teaching situations. Some music teachers stated that their principals were interested in using computers to teach students music composition. One principal liked the idea of children being able to print out their compositions and display them on the wall during parent visitation days. Other administrators have supported music technology because of the present focus on the use of computers in the classroom as part of the nationwide restructuring effort.

Most music teachers do not have a background in computers and few have had little training beyond a basic literacy inservice in this area. These teachers expressed

feelings of inadequacy about using computers and felt left behind. Those teachers who had not yet acquired a computer wanted to know what kind of computer to purchase. Also, inquires were made as to whether the software or hardware should be purchased first.

Other teachers voiced frustrations from their experiences of haphazardly attempting to purchase compatible hardware and software including the MIDI interface that links the computer to the instrument keyboard. Most of the questions that were asked focused on the three general areas of: (1) computer selection; (2) MIDI interface; and (3) the appropriate MIDI-compatible software.

Musical Instrument Digital Interface (MIDI) first became standardized in the electronic industry in 1983 (Cooper, 1987). Most of the synthesizers utilized by music teachers in this school district were purchased after 1985 and came installed with the MIDI outputs. Because some of these music teachers have recently acquired a computer, the next logical step would be to acquire some additional hardware and compatible MIDI software, and to use it in conjunction with their synthesizer and computer.

Stated simply then, music teachers in the school district are not adequately informed about MIDI technology and its potential classroom applications. This lack of knowledge hampers their ability to effectively select the appropriate software and hardware for their classrooms.

Problem Documentation

In November of 1990, the writer administered a three-part questionnaire (see Appendix A) to 50 elementary, middle, and high school music teachers. In the first section, questions were asked to determine teacher attitudes concerning the use of musical instrument digital interface (MIDI) in the classroom. Of the 30 music teachers who responded, 26 believed that MIDI could play an important role in their music program (see Table 1) and would incorporate it in their instructional setting when they acquired the necessary components.

Table 1

Teacher Attitudes Toward MIDI

Do you feel that MIDI can play an important role in your music program?

TOTAL	YES	NO	UNDECIDED
30	26	2	2

The responses in this section also indicate that most music teachers were not informed about MIDI hardware and software (see Table 2).

Table 2

Teacher Knowledge of Software and Hardware

Do you consider yourself knowledgeable about the wide array of MIDI hardware and software products?

TOTAL	YES	NO	UNDECIDED
30	2	28	0

In the second part, music teachers were asked about their computer experience. The results indicated that 17 out of the 30 respondents have either little or no computer training. Half of this group indicated that they had not yet attended a computer workshop (see Table 3).

Table 3

Music Teacher Attendance at Computer Workshops

Have you attended a computer workshop?

TOTAL	YES	NO
30	15	15

The remaining teachers acknowledged moderate or frequent use of word processing or data base programs. (see Table 4).

Table 4

Level of Computer Use by Music Teachers

Frequently	Moderate	Never	TOTAL
4	11	15	30

Thirdly, the questionnaire examined the frequency of which music teachers used MIDI compatible hardware and software products during the past school year. Although some teachers reported using MIDI compatible electronic keyboards and computers, practically all music teachers indicated that MIDI supported music notation, music sequencing and music instructional software were not

utilized in the past year.

Table 4

Average Number of Times in the Past School Year that MIDI Supported Software and Hardware were Used in the School District

SOFTWARE			HARDWARE	
Notation	Sequencing	Instructional	Computer	Keyboard
0	0	0	77	81

Causative Analysis of the Problem

The absence of county guidelines or procedures for reviewing and adopting music software has left music teachers on their own to the task of becoming informed and knowledgeable about MIDI technology. Many of the MIDI software and hardware products on the mass market are designed to be used in a variety of home, professional, and educational settings. A music teacher would have to sort through the vast array of products in order to select an appropriate combination that would fulfill his/her instructional objectives. In short, the music teacher's job constraints, coupled with the difficulties involved in previewing software, does not provide an accommodating milieu that supports the adoption of MIDI technology in the school district.

Because MIDI supported music sequencing and notation

programs are the equivalency of word processing for music (Greenwald, 1978), basic knowledge in the operation of the microcomputer is required in order to review these products. There is a documented belief that some music teachers do not have adequate computer skills to successfully preview MIDI software and that many have been somewhat resistant in acquiring them.

Teachers have not had access to adequate training in MIDI technology. In the past, music teachers in the school district have depended on inservice programs to introduce new innovations. Staff development programs have not been sufficient in this area to keep music teachers adequately informed about the growing number of new and innovative software/hardware products that could be utilized in the classroom.

Relationship of the Problem to the Literature

In reviewing the literature it became evident that in order to understand the problem, several important developments that have contributed to the adaptation of MIDI technology to the field of music instruction should be examined. They are (1) the establishment of computer-assisted instruction as an important field of instruction; (2) the technological developments in the music industry that led to the establishment of MIDI as an

innovation; and (3) the impact of these developments on the field of music instruction.

Computer-assisted instruction in music

The emergence of MIDI as a high-tech teaching tool in music education can be viewed as the extension of its two parent technologies - computer-assisted instruction (CAI) and digital synthesizers. CAI's establishment as a important instructional delivery system gives impetus to MIDI as a new teaching innovation.

Learning theorists and educators have long been interested in measuring what Cronbach and Snow (1977) describe as the interaction between the treatment effects, or instructional method, and the student's personality traits or learning style. Computer-assisted instruction, which grew out of Skinner's programmed instruction (PI) movement of the late 1950's, has provided educators with the most promising delivery system for closely matching instruction with the student's learning characteristics (Nievergelt, 1986).

CAI combines the psychological theories of PI and the computer's processing abilities to provide educators with what Eddins (1978) describes as a means "for rapid and continual interaction between the learner and the materials to be learned" (p. 22). Since the early days of CAI, many studies have been conducted to investigate the effectiveness of CAI in a variety of subject areas, including music.

Vinsonhaler and Bass (1972) reviewed ten major studies on CAI drill and practice at the elementary level, finding that supplemental CAI instruction improved scores on SAT performance. In studying student response characteristics using different methods of feedback, Kulhavy (1976) found increased retention among students who were given immediate feedback.

Kulik, Bangert, and Williams (1983) analyzed fifty-one studies and found that students involved in CAI scored higher on objective tests than did those involved in other types of instructional methods. Also, those students who used computers developed positive attitudes about the computer and the subject matter.

In contrast, Clark (1985) proposed that the results of the studies in the meta analysis by Kulik et al (1983), were overestimated and inconclusive, claiming that few variables were controlled and most of the studies were poorly designed.

In research conducted to assess student attitudes and conceptions toward specific features of CAI, Hativa (1989) found that not all features were beneficial for both high-aptitude and low-aptitude learners. Students of certain aptitudes encountered problems when using drill-and-practice exercises in multiplication. Price (1989) notes that most research has consistently found CAI to be effective in at least three areas: "improvement of

student achievement, saving student/teacher time, and fostering positive attitudes on the part of both teachers and students" (p. 154).

Dence (1980) suggests that many studies do provide important information about CAI but more so in some curriculum areas than others. Educators have reported positive results when using CAI in the instruction of foreign languages and science.

Music educators have suggested that since computers have had a strong impact on student achievement and attitudes in traditional academic subjects, CAI could also benefit music instruction as well. Some research conducted by music educators has also suggested that computer-based music instruction is beneficial in such areas as individualizing instruction, savings of time and conducting research.

Eddins (1978) proposed that because of the computer's interactive capabilities, a computer-based music instructional approach provides an effective method for the active involvement of the learner with the instructional content. Hofstetter (1979) found that college students using the computer saved time in developing ear-training skills and showed a willingness to experiment with alternative methods of instruction.

The computer's ability to process, sort, judge, analyze, and recall information was noted by Wood and

Clements (1986) as a superior teaching delivery when working with large groups of students. Pembrook (1986) suggested that some of the exclusive features of CAI allow for students to remediate themselves privately before advancing, progress at their own speed, and conduct self-evaluation.

Hosfstetter (1981), found that using the computer in teaching aural skills made more efficient use of instructional time, freeing up the teacher to assist students with individual learning problems. Deihl (1971) suggested that CAI provides a means for controlling troublesome variables when conducting research in the area of instrumental music.

Technological developments in music

Faber (1988) describes two developments as being responsible for increasing the use of computers in music education. First, the "improvement in synthesizer sounds and second, the introduction of musical instrument digital interface" (p. 22).

This advancement in digital electronics, which resulted in improvements in the electronic synthesizers, can be considered a corollary to the success of MIDI in the music industry. According to Powell (1987), the advances in digital technology have led to the replacement of the previous expensive and bulky synthesizers that were only capable of producing a few "bizarre electronic sounds " (p.27). Mathews and Pierce (1987) state that digital

sampling synthesizers which use digital memory to effectively reproduce traditional instrument sounds are gaining popularity with composers.

Margolis (1987) points out that before the arrival of digital electronics, performing on the synthesizer required the time consuming task of manipulating switches and wires to patch together sounds and many different instruments. Rona (1988) also pointed out that digital memory has made it possible for a single synthesizer to be used for different sounds during a performance, thus eliminating the laborious patchwork required to produce basic sounds.

Penfold (1988) reported that prior to 1983, data transmission between different makes and models of electronic instruments was virtually impossible. It was not until synthesizer manufactures developed a standard for the transmitting and receiving of digital information between all types of electronic musical instruments that musicians could successfully connect any instrument to the computer. This standard, known as MIDI, opened the door for a variety of applications in the music industry.

Bassett (1988) reports that most recording studios are now using MIDI because it allows the microcomputer to control what was once an incompatible array of electronic instruments. According to Balleras (1990), MIDI compatibility has been expanded to include such new products as drum units, signal processors, voice-to-MIDI converters,

guitar, wind, audio-mixers and stage-light controllers. Charbeneau (1987) states that composers are using "computers as musical instruments to compose the entire film or television score such as Ian Hammer does on Miami Vice" (p.35).

Bak (1989) and Bassett (1988) also reported that recording studios are becoming equipped with MIDI compatible gear along with computers because of the centralized control it offers. Zachmann (1989) reported that MIDI can provide unique applications in the desk-top presentation by utilizing the MIDI sound modules in conjunction with computer generated media.

With technological changes taking place in the music industry as a result of MIDI, some musicians have found their roles changing as well. Goodwin (1990) states that musicians of today are learning computer skills since hit records are now being recorded at home utilizing MIDI compatible instruments and microcomputer. Gordon (1987) reports that MIDI has effectively taken over such tasks as sound mixing and music copying, which has resulted in some job losses in the recording industry. Roper (1990) discusses applications for MIDI inside the theater in which a computer controls all aspects of sound and lighting instead of musicians and engineers.

Music education

Brawer (1988) reports that students have used MIDI

successfully at "San Jose High Academy to learn about music composition and to also reinforce other subjects such as history"(p.90). Other middle school students in a general music class reported increased motivation when using the computer as a music compositional tool (Flagg, 1986).

More recently, Rudolph (1990) reported that students at a northern middle school used MIDI technology in creating original compositions. According to Solomon (1989), students used MIDI supported music software to improve creativity.

Charbeneau (1987) and Dede (1989) have both reported on technological innovations as means of directly interfacing with the creative aspects of the arts, and therefore by-passing the long and sometimes painful development of technical skills.

It is a documented belief that most teachers feel that MIDI technology will play an important role in future music instruction, however, the decision has often been not to use technology because of the confusion about products.

Jordahl (1988) suggested that educators cannot keep up with the present rate that synthesizer hardware and music software are emerging on the market. In a survey taken by Hermanson (1989), respondents noted the difficulty in previewing music software before purchasing it. Cooper (1987) discussed the confusion that can result when shopping for MIDI sequencer software because of the different

terminologies and features used by producers. According to Milano (1987) the software producing industry is undergoing rapid expansion. To date, over 75 companies are currently producing MIDI software.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

The following goals and objectives were projected for this practicum:

The general goal of this practicum was to increase music teacher awareness of the technological applications of musical instrument digital interface in the classroom.

A second goal was to assist music teachers in becoming informed consumers of MIDI hardware and software, thus enabling them to make appropriate selections for their particular instructional setting.

This practicum was designed to accomplish the following objectives:

1. Music teachers would improve their skills in selecting and matching of MIDI hardware and compatible software.
2. Music teachers would improve their skills in the basic operations of MIDI compatible music sequencing software.
3. Music teachers would become proficient in the use of MIDI compatible music notation software.

4. Music teachers would become proficient in the use of MIDI compatible instructional software.

Standards of Achievement

1. The accomplishment of the objectives were to be measured by a minimum rating of 15 or more "yes" answers out of a possible 20 on the checklist (see Appendix B). Also, music teachers would be required to complete 4 out of the 5 tasks in each category for successful achievement of the objectives.

2. There would be a minimum completion rate of at least 7 music teachers in the training sessions. Since the participation in the training sessions was limited to ten, it was projected that a completion rate on 7 participants would be a representative number for the success of the practicum.

Evaluation Tools

The following activities will be used as assessment instruments for this practicum.

1. Music teachers would be observed at the beginning

and at the end of the first training session to assess their performance in selecting, matching, and connecting the computer and synthesizer along with MIDI compatible software in a working configuration.

2. Music teachers would be observed at the beginning and at the end of the training sessions to assess their performance in the basic operations of music sequencing, notation, and instructional software.
3. Music teachers will complete an evaluation form assessing the effectiveness of the training sessions (see Appendix D).

CHAPTER IV

SOLUTION STRATEGY

In a search for a solution for how music teachers could become more informed about MIDI software/hardware products and their educational applications, suggestions came from the literature as well as from the music teachers in the school district.

As noted before, music teachers have been encouraged at district meetings to attend conferences relating to music technology. Hermanson (1989) reported that most music teachers who attended a recent symposium in computer-assisted music instruction responded positively. Participants previewed a variety of software products using several different computers systems. Results on a follow-up questionnaire indicated that 30 percent of the music teachers who attended the symposium started using computers with their students.

Because of their many job constraints, along with the absence of financial support from the school district to attend conferences, this has not been perceived by many teachers as an attractive method of learning about MIDI.

Rudolph (1990) offers the suggestion that local music stores can assist music teachers in learning about MIDI hardware and software by providing demonstrations, free

trials, and the continuous assistance that will be needed for effective utilization. Music stores also sponsor seminars concerning electronic music periodically to promote new products. On the other hand, Bales (1986) and Hall (1986) advised educators not to be lured into buying any software until full compatibility of computer, synthesizer, and interface have been demonstrated. When buying synthesizers, Bianchi (1989/90) also encouraged music teachers to consider the advantages and disadvantages of each with respect to existing budget, the intended use, and sound quality.

The notion of allowing music dealers in the writer's district to conduct training sessions for teachers had two serious shortcomings. First, the tendency for some dealers to focus on mainly professionally oriented products rather than educational products would not be consistent with the practicum goals. Professional products, which are mainly geared for such esoteric applications found in the recording studio or on stage, usually possess many advanced features which can be a source of confusion for the beginner with little computer experience. And second, since an examination of MIDI products should include many different models and brands of hardware and software, the music store's limitation to only several different brands would not give music teachers a broad base of experience.

A major element of this practicum has been the research

into the many technological, music, education, and human behavior journals that relate to music technology. Since MIDI is a hi-tech innovation and products are constantly undergoing revisions and changes, the reading of these publications can provide music teachers with the most current thought and information about MIDI products (Feldstein, 1988). Milano (1987) and Penfold (1988) each noted the need for consumers to stay informed by reading publications and both provided a listing of current journals and trade magazines in their books. However, the obvious flaw in this suggestion is the absence of practical hands-on experience which is considered a requisite for becoming familiar with this technology.

The last suggestion came from the teachers themselves. As previously mentioned, music teachers have not had access to adequate staff development in MIDI technology and have noted the need for more training in this area (see Appendix A). Guskey (1990) suggested that inservice is the key to integrating technological innovations in the schools and according to Bruder (1988), most states do provide periodic inservice training in technology for teachers.

This suggestion is projected to be the most successful in addressing a solution to the problem because it represents the most practical and convenient method for music teachers in the school district to gain experience with MIDI technology.

Description of Selected Solution

The suggestion that training sessions be given in the use of MIDI software/hardware is one which was initiated by the music teachers themselves. As noted by Fullan (1990), teachers generally support the introduction of technological innovations through inservice training. Also, most music teachers preferred that training sessions be conducted by other teachers rather than outside consultants. Revenaugh (1989) reports that in the area of technology, teachers prefer having other teachers as trainers. The writer believes that in order to accomplish the practicum goals, some special concerns of staff development must be addressed.

As reported by Persky (1990), teachers will first need to acquire some basic computer skills and then gain confidence in operation of the software. Since most music teachers were viewed as being apprehensive toward using the computer at a recent meeting, anxiety is a key factor to which training must be sensitive.

Fulton (1988) and Champion (1987) encouraged teacher-trainers of technology to allow ample hands-on experience, and provide a high degree of support in order to raise teacher confidence levels. Banks and Havice (1989) advised trainers to avoid undue computer anxiety by "avoiding technical books, encouraging experimentation and

by expecting things to go wrong"(p. 23).

It is anticipated that training sessions which will introduce music teachers to numerous software programs will need to draw from methods of instruction consistent with adult learning styles. Strategies that present the content through individualized instruction, self-direction, group cooperation, and hands-on activities will be utilized (Fahy, 1985). Also, it is projected that training sessions should be conducted in a climate of positive support with great enthusiasm on the part of the instructor.

Report of Action Taken

After obtaining permission from the school district, the first phase of the practicum began with the acquisition of the necessary hardware and software in which to plan the training sessions. As supported by the literature, the importance of the hands-on component in staff development is the key to encouraging teachers to adopt technology. This necessitated that a number of MIDI compatible hardware and software products be secured for the teachers to preview.

In order to customize the workshop to the individual participant's need, the inclusion of computers that were used in their work setting was viewed as important. Because of the limited number of MIDI interfaces available, the participation in the training session was limited to ten. A

questionnaire (see Appendix C) was sent to the 10 participants to determine what computer system was used or preferred at their respective school sites (see Table 5).

Table 5

Type of Computer Used by Participants N = 10

Type	Number
IBM (compatible)	3
APPLE (IIe)	2
APPLE (IIGS)	2
AMIGA	2
MACINTOSH	1

Since the training sessions required a site with access to IBM, Apple IIe, Apple IIGS, Amiga and Macintosh computers, the writer's elementary school was chosen because of the availability of most of these computer systems. Consultations with the school principal and the district teacher education office personnel were conducted in order to plan and schedule the optimum dates for the training sessions (see Appendix D). Additionally, a letter was sent to all music teachers which summarized the workshop and the scheduled meeting times (see Appendix E).

Forty software producers listed by Milano (1987) and Jordahl (1988) were sent a letter of solicitation which included the following information: (1) the objectives of the training sessions; (2) a request for demos or software

loan; and (3) the type of computers used in the training sessions (see Appendix F). These letters were also followed up with a telephone call whenever possible. It should be noted that several of the producers with 800 numbers conveniently allowed for the ordering of Demo software and other information by leaving their name and address on an answering machine.

The writer was successful in contacting ten software producers which responded over the next few weeks by sending either a demo or loaning the complete program (see Appendix G). It was encouraging that most of the producers that were contacted by telephone were positive, helpful, and viewed the practicum effort as important. Most of them indicated a serious desire to have feedback from the participants concerning their products.

When making requests for music instructional, sequencing, and notation software, it was discovered that some producers offered the same program for several different computer systems. Because of the limited number MACINTOSH and IBM computers that were available in the training sessions, this was found to be beneficial because it saved time by allowing many participants to preview the same program simultaneously.

One obstacle that was encountered by the writer was an underestimation of the amount of time and effort required in the task of preparing and installing the software on the

various computer systems. Over twenty-five MIDI compatible software programs were acquired for the training sessions, however, because of the time constraints, only nineteen could be used.

Since it was not realistic to expect the manufacturers of MIDI hardware to loan their products for the training sessions, the writer took the advice of Balleras (1990) and secured the necessary hardware such as synthesizers, amplifiers, and other accessories from a local music store. Other sources that contributed to the needed hardware were the school district, other individuals who were MIDI network users and the writer's personal equipment inventory (see Appendix H).

In the next phase of the implementation, the writer planned and conducted five after school training sessions beginning in February and ending in May of this school year. The topics of the five training sessions were as follows:

April 8 1. Overview of MIDI, hardware and software.

April 15 2. Introduction to MIDI compatible music sequencing software.

April 22 3. Introduction to MIDI compatible music notation software.

April 29 4. Introduction to MIDI compatible music instruction software.

May 16 5. Discussion of amplification and sound reinforcement.

The information from the attendance roster indicated that the music teachers attending the workshops came from mainly two different instructional levels--elementary and middle school (see Appendix I). Teaching experience ranged from seven years to twenty-nine years and backgrounds varied, including band directors, choral and elementary instructors, and one private piano teacher from the community (see Table 6). It was interesting to note that each participant possessed a strong background in performance and was currently participating in or conducting a community oriented performing group (i.e. Orchestra, Chorus, Piano Recitals etc..).

Table 6

Summary: Background Information on Workshop Participants

PARTICIPANT	SCHOOL	AREA	YEARS TEACHING
Participant 1	Middle	Band	25
Participant 2	Middle	Band	7
Participant 3	Middle	Chorus	19
Participant 4	Elementary	Vocal/Inst.	10
Participant 5	Elementary	Vocal/Inst.	23
Participant 6	Elementary	Vocal/Inst.	29
Participant 7	Elementary	Vocal/Inst.	15
Participant 8	Elementary	Vocal/Inst.	17
Participant 9	Elementary	Vocal/Inst.	19
Participant 10	None	Piano/Inst.	25

First Workshop: Overview of MIDI, hardware and software.

The first training session was planned to provide an overview of MIDI compatible hardware and software. First, to demonstrate the versatility and power of this technology, the participants listened to several short musical excerpts using "Cakewalk" version 2.0 Demo, an Epson 386 laptop computer, a Roland MT-32 multi-timbral sound module, and a Roland MPU MIDI interface. A pre-observation was then conducted to assess the participants knowledge in selecting, matching, and connecting MIDI hardware with compatible software in a working configuration (see Appendix J).

Notes were prepared by the writer and distributed to all workshops participants (see Appendix K). A brief overview was presented about the applications of MIDI to music, computers, and synthesizers. A demonstration was conducted on how to connect all components to a MIDI network using MIDI cables. Information was given about the compatibility of different computer systems with various types of MIDI interfaces, peripherals and other accessories. As each MIDI hardware component was identified, the terminology relating to that product was also introduced.

In order to introduce the concept of music sequencing, the participants were guided through a brief hands-on activity using an Ensoniq ESQ-1 with an on-board MIDI compatible sequencer. In this activity, the parameters on the sequencer were set so that the participants could easily

accomplish the task of composing, editing, and replaying a short melody. Since the on-board sequencer required no elaborate series of keystrokes or software to be loaded, this provided the optimum means for ensuring a successful first experience with music sequencing for most of the participants.

Next, the participants were introduced to "Cakewalk", an IBM compatible software-based sequencing program by Twelve Tone Systems. The editing features from the on-board sequencer such as quantization, transposition, track/channel assignment and playback were compared to those of "Cakewalk". Using the two available computers, the participants took turns loading and replaying the demosongs provided with the "Cakewalk" demo.

Features such as copying, cut-and-paste, and data storage were first demonstrated and then practiced by the participants. As was noted earlier, Greenwald (1988) pointed out the similarities of music sequencing to word-processing. It was interesting to note that all participants who used word-processing recognized this similarity as they became increasingly familiar with the operations of music sequencing. Although on-board sequencing was viewed as a more user-friendly approach to sequencing versus the software-based approach, most participants commented on "Cakewalk's" graphic display of work in progress. To conclude the first session, the

participants were evaluated using the first part of the observation checklist. The results were tabulated and outlined in Appendix L.

Second Workshop: MIDI Compatible Music Sequencing.

In this training session, demonstration software for the MACINTOSH and IBM were explored. A pre-observation was first conducted to assess the participants' knowledge in the operation of music sequencing software (see Appendix J). Taking the suggestions of Bork (1988) the participants were asked to work individually or in small groups and preview the sequencing programs. As noted by Persky (1990), the need for teachers to have an instructional focus as well as knowing how to hook up the hardware was viewed as a key component in accomplishing the practicum goals. To accomplish this, a four part software evaluation form was developed by the writer and used by the participants in previewing each program (see Appendix M). To make participants more aware of correctly matching the software to appropriate hardware, the first part was concerned with listing the hardware requirements needed to operate the program. In the second part, the participants were asked to reflect on how the program could be integrated into their individual work settings and to write an instructional objective. Next, the participants were to list specific strategies by which to accomplished the objective. And the last section of the evaluation form asked for the

participants comments about the program.

At the conclusion of the second session, the participants were evaluated using the second part of the evaluation checklist. The results were tabulated and are listed in Appendix L.

Third Workshop: MIDI Compatible Music Notation Software.

A pre-observation was conducted to assess the participants knowledge in operation of music notation software (see Appendix J). During this meeting, two demonstrations were conducted by the writer to introduce music notation software. In the first one, "Music Writer" 2.0 by Pyware was used because the software producer had sent the complete version of the program. Also, as mentioned earlier, almost half of the workshop participants used an APPLE IIGS in their work setting.

After the grand staff configuration and tempo were selected, a short melodic line was composed (played). The notes were inputted (real-time mode) on screen using an Ensoniq SQ-80 digital wave synthesizer and a APPLE IIGS computer with a Passport MIDI interface. The editing option was then selected and the copy function was used to double the length of the piece. After the print option was chosen, the music was printed out using an "Imagewriter" dot-matrix printer.

The next two demonstrations utilized the IBM compatible demo programs, "SongWright" by SongWright software and

"Music Printer Plus" by Temporal Acuity. The participants were taken through the same procedures as above except for printing out the composed piece. The print functions on both programs were disabled (a feature of all demo notation programs that were reviewed). However, a sample of a score from both programs was printed by loading the pre-existing song files (see Appendix N).

Since the terminology is not standardized among software producers (Greenwald, 1987), the participants examined some of the differences among each of the programs. It was important to point out that each program utilized its own system of key functions which necessitated some practice before any degree of familiarity could be achieved. This non-standardization resulted in some confusion as the participants learned one program then tried to apply that knowledge to another.

Most of the remaining session was designated for the participants to be engaged in the hands-on previewing of music notation programs for the APPLE IIe, APPLE IIGS, MACINTOSH and the IBM computers systems.

At the conclusion of the third training session, the participants were evaluated using the third part of the observation checklist. The results were tabulated and are listed in Appendix L.

Fourth Workshop: MIDI Compatible and Non-MIDI Compatible Music Instructional Software.

A pre-observation was conducted to assess the participants knowledge in the operation of music instructional software (see Appendix J). In this training session, the participants began to preview nineteen MIDI and non-MIDI compatible music instructional programs provided by Electronic Courseware and Temporal Acuity Products. Although the focus of this practicum is MIDI technology, these software producers provided some excellent computer-based music instructional programs. Most of the participants had not yet completed their own MIDI network system but had access to computers at their work settings. These non-MIDI programs provided a viable non-MIDI alternative for enhancing their music program through the use of technology. However, as noted before, Jordahl (1988) proposed that the range and quality of sounds from the internal speakers of the computer are vastly inferior to that of a electronic synthesizer in a MIDI network.

Hermanson (1989) encouraged piano teachers to capitalize on the use of music instructional software to assist in teaching music theory. Several software programs loaned by Electronic Courseware focused on teaching the basics of keyboard fingerings for chords and scales.

The participants all noted that the instructional software provided by Electronic Courseware to be used on Apple computers were self-booting programs which made the

previewing a much simpler task. This would also make it easier for students to use. Another valuable feature found on some music instructional software was the scoring and record keeping parameter. This was viewed important because of the capability to manage and retrieve valuable data about the student's progress.

Since the participants noted the need for more time to complete all of the instructional software, the training session was extended into the next meeting.

Fifth Workshop: Discussion of Amplification and Sound Reinforcement.

The first part of this training session was a continuation of the previous one. The participants completed their previewing and evaluation of the remaining music instructional software and completed an evaluation using the fourth part of the observation checklist. The results were tabulated and are listed in Appendix L. The participants also completed a district workshop evaluation of the training sessions and workshop instructor (see Appendix O).

Good audio production is a key variable to obtaining superior sound quality from a MIDI network system. After decisions have been made about which computer, synthesizer, and software to purchase, the selection of the appropriate amplifier is an important consideration (since most

synthesizers are not equipped with speakers) if quality sound reproduction is to be assured.

Following the advice of Rudolph (1990), the writer scheduled and conducted the last part of this training session at a local music store. Because the electronic keyboard representative could not be on hand for the date of the regularly scheduled training session, this meeting had to be rescheduled. The literature supported the idea of utilizing the expertise of music industry personnel to learn about MIDI products. Also a discussion of sound reinforcement equipment necessitated an on site visit to be able to examine a variety of amplification systems. The participants examined amplifiers with the appropriate features necessary to provide the clearest audio reproduction with respect to application, portability, and cost.

Several demonstrations were conducted by store personnel using a Yamaha MIDI grand piano, a Yamaha Disk Orchestra/ Module DOM-30, and a Yamaha Clavinova. These demonstrations provided the most advanced state-of-the art examples of on-board sequencing in which classic performances, along with their orchestral accompaniments, were digitially recorded using a MIDI compatible sequencing program. These performances were available on 3.5" micro-floppy diskettes, and could be loaded into the control panel of the grand piano and then played. As stated earlier

by Goodwin (1990), MIDI sequencing "allows the performer to bypass the recording studio entirely and create Hi-Fidelity recordings" in the comfort of one's own home (p.49). To demonstrate that only electronic data is recorded on these diskettes (not actual musical sounds), a MIDI cable was removed from the grand piano during a performance and connected to an electronic keyboard. The result was the same performance only with different sounds.

The comments expressed by the participants indicated that the motivational aspects of listening to live, digitially recorded (sequenced) performances of Grieg's "Piano Concerto in E minor" and Chick Corea's performance of "Spain", complete with every nuance of expression, was viewed as an appropriate culminating activity for the workshop.

An additional follow-up questionnaire was sent to the participants to solicit their responses about the training sessions (see Appendix P). A summary of the responses is listed in Appendix Q. In addition, a follow-up letter was sent thanking them for taking part in the workshop (see Appendix R).

CHAPTER FIVE: REPORT

Results, Discussion, and Recommendations

Results

The purpose of this practicum was to increase music teachers' awareness of the applications of MIDI to better enable them to effectively select the appropriate software and hardware for their classrooms.

The writer successfully contacted 10 software producers and acquired an extensive amount of MIDI compatible music sequencing, notation, and instructional software. Five after school training sessions were planned and conducted by the writer.

Standards for achievement and behavioral objectives were as follows:

An overall minimum rating of 15 or more "yes" answers out of a possible 20 on the observation checklist (see Appendix B) was to be an acceptable score for successful completion of the objectives. Also, a completion of 4 out of the five tasks in each category of the checklist was to be accomplished.

1. In the first objective, music teachers were to

improve their skills in selecting and matching MIDI hardware and software. The first training session was planned to introduce the various hardware and software components of a MIDI network system. A summary of the post-observation indicates that all participants were successful in completing the required 4 tasks of matching compatible software then connecting the components of a MIDI network system in a working configuration (see Appendix L).

2. In the second objective, music teachers were to improve their skills in the basic operations of MIDI compatible sequencing software. At the conclusion of the second training session, the post observation results indicated that all music teachers were successful in performing a minimum of 4 operational tasks using sequencing software of their choice (see Appendix L).

3. In the third objective, music teachers were to become proficient in the use of MIDI compatible music notation software. The third training session was devoted specifically to music notation programs. The post-observation indicated that all 10 music teachers were successful in completion of the minimum of 4 operations of notation software of their choice (see Appendix L).

4. In the fourth objective, music teachers were to become proficient in the use of MIDI compatible instructional software. It was expected because of the large number of instructional programs that were available,

it would require the fourth training session and part of the fifth to preview them. Since these music instructional programs were viewed as being user-friendly and were oriented specifically for the classroom, the music teachers easily performed all 5 required tasks on the software of their choice (see Appendix L).

Because the participation in the training sessions was limited to ten, it was projected that a completion rate of 7 participants would be a representative number for the success of the practicum. This expectation was certainly surpassed with all ten participants successfully completing the workshop.

Also, the positive responses to a questionnaire completed by the participants at the conclusion of the workshop were another indication that goals of the practicum had been achieved (see Appendix Q). These responses provided a clear indication that the participants had experienced success and enjoyed the climate of mutual support from the instructor and other colleagues during the workshop.

Discussion

The completion of tasks, perfect attendance, and active participation in all phases of the training sessions exemplified a genuine commitment on the part of the music teachers to become more involved in music technology. All of the expectations for the practicum were surpassed. An

explanation for this was reflected in the responses about the workshop (see Appendix Q). As the training sessions progressed, the music teachers became familiar with MIDI software/hardware, gaining confidence and developing skills in utilizing this technology.

In summary, the results of the practicum strongly indicated that music teachers are more likely to adopt and become proficient in the use of MIDI technology, when sufficient hands-on experiences utilizing the actual programs and hardware are provided. However, teachers recognized the need for expanded training in each of the areas (sequencing, notation, instructional). As suggested by Fulton (1988), training should be a continuous practice to keep pace with the rapid changes in the software market. In addition, as indicated by their positive responses and contributions of software to the practicum effort, the developers of software have a direct interest in improving the capacities of teachers to use MIDI technology.

Recommendations

Based on the results of the training sessions, the following recommendations are offered:

1. Additional workshops should be conducted on music sequencing, music notation, and music instructional software. Because of the extensiveness of this software, workshops should focus on a single

program.

2. Future training sessions on MIDI compatible music notation software should include laser printers to examine desktop publishing capabilities.
3. Organize a district committee to review music software utilizing the interested workshop participants.

Dissemination

The notes distributed to workshop participants will be disseminated to other interested music teachers in the school district. Also, the strategies and objectives that were written during the examination of software will be duplicated and distributed to all workshop participants (see Appendix M). Other plans for dissemination include:

1. Honor a request by software producers by sending the results of the software evaluations concerning their products to them (see Appendix M) .
2. As a result of the suggestions made by the participants of the workshop (see Appendix Q), a request will be made to the district to allocate funds for additional MIDI interfaces, computer hardware, and integrative sequencing/notation software.
3. Submit a copy of the practicum to the district Teacher Education Center to be used as a guide for future workshops of this kind.

4. Submit journal articles about MIDI compatible software for publication.

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APPENDIX A

QUESTIONNAIRE TO ASSESS THE DEGREE OF KNOWLEDGE AND USE OF MIDI TECHNOLOGY AMONG MUSIC TEACHERS IN THE SCHOOL DISTRICT

QUESTIONNAIRE TO ASSESS THE DEGREE OF KNOWLEDGE AND USE OF MIDI TECHNOLOGY AMONG MUSIC TEACHERS IN THE SCHOOL DISTRICT

1. Do you feel that MIDI technology can play an important role in your music program?
   yes_____ no_____ undecided_____

2. If a MIDI system (computer, MIDI interface, synthesizer, and software) is acquired, would you use it in your setting?
   yes_____ no_____ undecided_____

3. Do you consider yourself knowledgeable about the wide array of MIDI hardware and software products?
   yes_____ no_____ undecided_____

4. Do you feel that training sessions offered to assist in the selection of MIDI hardware and software would be beneficial to music teachers?
   yes_____ no_____ undecided_____

---

1. Have you attended a computer workshop? yes_____ no_____

2. At what level of computer proficiency do you place yourself?

A. _____ never used a computer before.
B. _____ have taken one or two computer training sessions and do not use very often.
C. _____ moderate use of word processing or equivalent programs.
D. _____ frequent use of managerial, word processing, data base or similar programs.

3. What computer system(s) are you familiar with?

APPLE	_____
IBM (or compatible)	_____
MACINTOSH	_____
AMIGA	_____
OTHER	_____
NONE	_____

A. Please indicate if you have the following in your instructional setting:

1. MIDI compatible electronic keyboard yes_____ no_____

2. A computer.
   yes_____ no_____

3. A MIDI interface.
   yes_____ no_____

4. MIDI supported music notation program(s).
   yes_____ no_____

5. MIDI supported music sequencing program(s).
   yes_____ no_____

6. MIDI supported music instructional program(s).
   yes_____ no_____

B. If the answer was yes in any of the above please indicate the approximate number of times used in your classroom in the past year.

1. MIDI compatible electronic keyboard.
   number_____

2. A computer.
   number_____

3. Music notation software (MIDI).
   number_____

4. Music sequencing software (MIDI).
   number_____

5. Music instructional software (MIDI).
   number_____

6. Other MIDI hardware or software used in your classroom.

   Name brand_____

   number_____

APPENDIX B

MIDI TECHNOLOGY OBSERVATION CHECKLIST

MIDI TECHNOLOGY OBSERVATION CHECKLIST

Teacher_____

yes/no

I. Evidence of teacher's ability to select, match, and connect MIDI hardware with compatible software in a working configuration.

_____ Appropriate MIDI interface installed in computer.
_____ Computer and synthesizer connected.
_____ Computer and appropriate software matched.
_____ MIDI software installed on computer.
_____ Appropriate peripherals installed.

II. Evidence of music teachers successfully performing the basic operation on music sequencing software.

_____ Program successfully loaded.
_____ Select tracks, voices, tempo, and meter.
_____ Select MIDI instruments.
_____ Record a short sequence and save to disk.
_____ Exit program.

III. Evidence of music teachers successfully performing the basic operations on music notation software.

_____ Program successfully loaded.
_____ Input notes from keyboard.
_____ Build a score.
_____ Print the score.
_____ Exit program

IV. Evidence of music teachers successfully performing the basic operations on music instructional software.

_____ Program successfully loaded.
_____ Identify skills level.
_____ Engage in drill, simulation, or tutorial.
_____ Engage in testing or remediation.
_____ Exit program.

APPENDIX C

COMPUTER SYSTEM SURVEY

Computer System Survey

1/7/91

To: Workshop Participants,
From: Glen Neese
Re: Music Technology Workshop

Dear Colleagues,
In order to better plan and organize the training sessions, it would be very helpful to know the type of computer system(s) that you are presently using. Please indicate the type and number below.

_____ IBM (or compatible)
_____ APPLE IIGS
_____ APPLE IIe
_____ MACINTOSH
_____ AMEGA
_____ OTHER

CIRCLE ONE

YES NO I have a complete MIDI network system (computer, MIDI compatible electronic keyboard, MIDI interface).

Please return as soon as possible.

APPENDIX D

DISTRICT WORKSHOP PLANNING FORM

Teacher Education Center Planning Form

DATE: October 2, 1990

TITLE: MUSIC TECHNOLOGY 1.0

GENERAL OBJECTIVES:

To increase teacher awareness of the technological applications of M.I.D.I. (musical instrument digital interface) in the classroom/

SPECIFIC OBJECTIVES:
The successful participants will be able to complete the following tasks on the observation checklist:

1. Select, match, and connect a MIDI network in a working configuration.

2. Perform the basic operations of MIDI compatible music sequencing software on an available computer system.

3. Perform the basic operation of MIDI compatible music notation software on an available computer system.

4. Perform the basic operations of MIDI and non-MIDI MIDI compatible instructional software on an available computer system.

STRATEGIES:
The workshop leader will include but not be limited to the following instructional techniques to conduct each session: lectures, demonstrations, resource persons and group activities to present the content and meet the objectives.

EVALUATION:
The accomplishment of the objectives will be measured by a minimum rating of 15 or more "Yes" answers out of a possible 20 on an observation checklist. Also, participants should complete 4 out of 5 tasks in each category for successful achievement of the objectives.

APPENDIX E

WORKSHOP SUMMARY/MEETING DATES

To: Workshop Participants
From: Glen Neese
Re: Music Technology Workshop

Dear Colleague,

Thank you for your response to the questionnaire concerning music technology.

In order to avoid a conflict with the upcoming marching band conference, the meetings have been re-scheduled. At the first training session we will decide as a group if any other dates need to be changed (such as a April 8, which is Honor Band).

The focus of the training sessions will be to examine various types of MIDI software programs such as sequencing, notation, and instructional programs. It is hoped that the planned activities will provide the opportunity for us to gain some valuable hands-on experience with this innovative new technology.

Many software producers have been very cooperative by sending their most current Demo software to assist us. It is anticipated that many more will respond before the workshop begins.

I look forward to seeing all of you there. Please contact me if you have any questions.

Glen Neese
833-3371

MEETING DATES

First meeting -	April 8
Second meeting -	April 15
Third meeting -	April 22
Fourth meeting -	April 29
Last meeting -	May 6

<u>All meetings will be held at my school</u>

APPENDIX F

SOLICITATION LETTER TO SOFTWARE PRODUCERS

Solicitation Letter to Software Producers

February 19, 1991

Dear Software Producer,

We are conducting a workshop in our school district to increase the awareness of music teachers about the wide array of MIDI products that are currently available to the market.

As a result of the training sessions, we hope that teachers will be able to select the most current and appropriate MIDI software for their particular settings with respect to the following: (1) budget; (2) kind of computer system; (3) MIDI equipment on hand (synthesizer, interface, etc..); and (4) instructional level.

Since this workshop will focus on hands-on training with sequencing, notation, and instructional programs, we are asking your assistance in providing us with some of your most current MIDI products on a temporary loan or possibly a 45 day review. Also, there are a variety of different computer systems that are in use throughout our school district. The training sessions will utilize the following:

IBM (or compatible)
APPLE IIGS
APPLE IIe
MACINTOSH
AMIGA

We hope that you can help us with this important effort to facilitate music teachers in the use of music technology in our school district.

Sincerely,

Glen Neese

APPENDIX G

LIST OF RESPONDING SOFTWARE PRODUCERS

List of Software Producers and the Software Used

MUSIC SEQUENCING SOFTWARE

Twelve Tone Systems (no address listed)
1. "Cakewalk" 2.0 Demo (IBM 5.25)

Mark of the Unicorn
222 Third Street/ Cambridge, MA (617/576-2760)
2. "Performer" 3.6 Demo (MACINTOSH 2-3.5)

Passport Designs, Inc.
625 Miramontes St., Suite 103/ Half Moon Bay, CA 94019 (415/726-0280)
3. "Trax" Demo (IBM 3.5)
4. "Trax" Demo (Macintosh 3.5")

MUSIC NOTATION SOFTWARE

Temporal Acuity Products
300 120th Ave. NE Building 1/ Bellevue, WA 98005 (206/462-1007)
1. "Music Printer Plus" Demo (IBM 2/ 3.5) (IBM 3/ 5.25)

SongWright Software
7 London Street/ Leesburg, VA 22075 (703/822-9068)
2. "SongWright" Demo (IBM 5.25)

Jim Miller's Personal Composer
3213 W. Wheeler ST., Suite 140, Seattle, WA 98199 (1/800/446/8088)
3. "Personal Composer 3.3" Demo (IBM 5.25)

Passport Designs, Inc.
4. "Master Tracks Pro" Demo (IBM 3.5/5.25)
5. "Note Writer II" Demo (MACINTOSH 3.5)
6. "Master Tracks Pro" Demo (MACINTOSH 3.5)

Pygraphics
P.O. Box 639/ Grapevine, TX 76051 (817/481-7536)
7. "Music Writer" 2.0 (APPLE IIGS 3.5) (APPLE IIe 5-5.25)

CODA Music Software A Wenger Company
1401 E. 79th Street/Bloomington, MN 55425 (800/843-2066)
8. "Finale" 1.1 version Demo (IBM 3.5)
9. "Finale" 2.0 version Demo (Macintosh 3.5)
10. "Music Prose" 2.0 version Demo (Macintosh 3.5)

MUSIC INSTRUCTIONAL SOFTWARE

Electronic Courseware Systems
1210 Lancaster Drive/ Champaign, IL 61821
(217/359-7099)

The following programs were loaned for the training sessions:

1. "Microband" by Gary E. Smith (IBM 3.5)
2. "Clef Notes" by David Peters (IIe+ 5.25)
3. "Keyboard Chords" MIDI by Peters (IBM 3.5)
4. "Keyboard Jazz Harmonies" MIDI Brownlee (IBM 5.25)
5. "Keyboard Extended Jazz Harmonies" (IBM 5.25)
6. "Keyboard Fingerings" MIDI by Peters (IBM 3.5)
   (Evaluation and record keeping)
7. "Musical Stairs" (IIe+ 5.25)
8. "Musical Composer Quiz" (IIe+ 5.25)
9. "Keyboard Note Drill" by J. Eddins (IIe+ 5.25)
10. "Early Music Skills" (non MIDI) Gilkes (IIe+ 5.25)

Temporal Acuity Products
300 120th Ave. NE Building 1/ Bellevue, WA 98005
(206/462-1007)

11. "Note Blaster" Hofstetter/Ernst (IIGS 3.5)
    Micro Music Software Library Master Edition
12. "Terms/History" Demo Disk #1 (IIGS 3.5)
13. "Scale Theory" Demo Disk #2 (IIGS 3.5)
14. "Interval Theory" Demo Disk #3 (IIGS 3.5)
15. "Melodic Dictation" Demo Disk #4 (IIGS 3.5)
16. "Chord Theory" Demo Disk #5 (IIGS 3.5)
17. "Rhythm Theory" Demo Disk #6 (IIGS 3.5)
18. "Combination/Error Detection Demo Disk #7 (IIGS 3.5)

Ibis Software
90 New Montgomery St. Suite 820/ San Francisco, CA 94105 (415/546-1917)

19. "Play it by EAR" (IBM 3.5)

APPENDIX H

EQUIPMENT LIST OF MIDI HARDWARE AND ACCESSORIES USED

List of MIDI Hardware and Accessories Used in the Workshop

Roland MT-32 Sound Module
Roland MPU-IPC-T MIDI Interface
Roland MPU-IPC MIDI Interface
Ensoniq ESQ-1 Digital Wave Synthesizer
Ensoniq Mirage Digital Sampling Synthesizer
(2) Bose 802 Speaker System
Epson LT-386sx Laptop Computer 2 megabyte RAM/ 40 megabyte hard disk-drive
Epson Equity
AMEGA 2000/ 1 Megabyte of RAM/ 40 Megabyte Hard disk-drive
ECE MIDI Interface
Hi-resolution Monitor
Kawai K4 Digital Synthesizer
Roland D110 Sound Module
Proteus 2 Sound Module
Yamaha Disklavier
Yamaha Disk Orchestra/ Module DOM-30
Yamaha Clavinova
(3) APPLE IIe computers
(6) APPLE IIGS computers
(2) MACINTOSH LC Computers

APPENDIX I

ATTENDANCE ROSTER FOR TRAINING SESSIONS

ATTENDANCE ROSTER

Participant Name	School	Area	Yrs.of Teaching Exper.
Participant 1			
Participant 2			
Participant 3			
Participant 4			
Participant 5			
Participant 6			
Participant 7			
Participant 8			
Participant 9			
Participant 10			

Number of Training Sessions Attended	1	2	3	4	5
Participant 1					
Participant 2					
Participant 3					
Participant 4					
Participant 5					
Participant 6					
Participant 7					
Participant 8					
Participant 9					
Participant 10					

APPENDIX J

SUMMARY PRE-OBSERVATIONS RESULTS

SUMMARY: PRE-OBSERVATION RESULTS OF THE MIDI TECHNOLOGY OBSERVATION CHECKLIST

I. Evidence of the participants ability to select, match, and connect MIDI hardware with compatible software in a working configuration.

Number of Participants Completed	Not completed	
1	9	Appropriate MIDI interface installed in computer.
2	8	Computer and synthesizer connected.
5	5	Computer and appropriate software matched.
2	8	MIDI compatible software loaded on the computer.
0	10	Appropriate peripherals installed

II. Evidence of participants successfully performing the basic operations on music sequencing software.

Completed	Not completed	
2	8	Program successfully loaded.
0	10	Select tracks, voices, tempo, and meter.
0	10	Select MIDI instruments (channels).
0	10	Record a short sequence and save to disk.
0	10	Exit program.

III. Evidence of participants successfully performing the basic operations on music notation software.

Completed	Not completed	
3	7	Program successfully loaded.
0	10	Input notes from keyboard.
0	10	Build a score.
0	10	Print score from data disk.
0	10	Exit program.

IV. Evidence of participants successfully performing the basic operations on music instructional software.

Completed	Not completed	
8	2	Program successfully loaded.
8	2	Identify skills level.
8	2	Engage in drill, simulation, or tutorial.
8	2	Engage in testing or remediation.
8	2	Exit program.

APPENDIX K

NOTES DISTRIBUTED TO WORKSHOP PARTICIPANTS

Notes Distributed to Participants

MIDI

MIDI stands for musical instrument digital interface. It is an industry-wide protocol for exchanging digitally encoded data from one instrument to another, or from computer to instrument. This data contains information about timbre, duration, pitch, dynamics, and other parameters which manipulate musical sounds.

Ports

Communication is accomplished through the "MIDI-in", "MIDI-thru", and "MIDI-out" connections using MIDI cables. In a typical MIDI network, the computer's "MIDI out" connection sends data down line entering the "MIDI-in" of the first keyboard. Information from the first keyboard using it's "MIDI-thru" connection is then sent further down line to another MIDI device. Information can also be sent back to through the MIDI input of the computer using the same connection.

Channels

Each MIDI instrument in the network can be designated one of the sixteen channels which allows independent communication with the computer. Without this MIDI feature, all keyboards would be playing the same data.

Modes

There are four receiver modes with variations of OMNI ON/OFF and POLY/MONO in the following configurations.

Mode A. OMNI-ON/POLY. The instrument(s) responds to information on all channels and plays polyphonically.

Mode B. OMNI-ON/MONO. The instrument(s) responds to information on all channels and plays monophonically.

Mode C. OMNI-OFF/POLY. The instrument(s) responds only to a designated channel and plays polyphonically.

Mode D. OMNI-OFF/MONO. The instrument(s) responds to any designated channel and plays monophonically.

Interfaces

A MIDI interface must be used between the computer and the instrument. It acts as a regulator, matching the computer baud rate to the MIDI standard baud rate (31.25K). Swigart (1988) points out that some software may not be compatible with all MIDI interfaces. The most common types of MIDI interfaces are connected to the computer either externally (connecting to a serial port) or internally (fitting into an empty expansion slot). Many of the interfaces are equipped with features such as multiple ports and microprocessors which allow the computer to carry out multi-tasking during data transmission. Current costs range from $100 dollars for a simple MIDI interface (Roland MPU $199.00, Passport IIe $99.00).

Keyboards and Modules

A synthesizer consists of a keyboard (controller) and the sound source component. A MIDI device which contains only the sound source component is called a sound module (or sometimes an expander). When buying an electronic keyboard, its sound, price, as well as its touch should be considered (Bianchi, 1990).

Sound Generation

Basically their are two types of sound producing methods found in the construction of most electronic keyboards. Digital sampled keyboards such as the Mirage made by Ensoniq feature sounds that have been digitally recorded. With these instruments, the user can connect a microphone or patch cord and sample (digitally record) any other instrument or acoustic sound. Because of this, sampling keyboards can usually obtain the most realistic sounds.

Synthesizers create sounds electronically through a variety of methods. Two of the most popular are FM synthesis (Frequency Modulation) featured on Yamaha keyboards and the S/A synthesis (Structured Adaptive Synthesis) sound production which is found on Roland products. These synthesis methods allow the flexibility of creating and storing of your own sounds.

Common MIDI Terms

Touch Sensitive: the keyboard will respond to how fast a key is depressed.

After Touch Sensitive: the keyboard will respond to pressure on the keys after initially being struck (can be used for effects such as changing the timbre).

MIDI Volume: information about the volume is sent to other MIDI devices down line (in order to respond, those devices must be equipped with this feature).

Real Time Mode: is an important feature of most MIDI compatible software which allows instantaneous, on-screen viewing of notes as they are inputted on the keyboard.

Presets or Patch Changes: memory resident sounds that can be edited and accessed by MIDI (128 sounds can be accessed by MIDI).

Channel: is one of the 16 pathways on which MIDI data can be transmitted or received.

Poly Mode: the keyboard will respond to data only on a specified channel.

Omni Mode: the keyboard will respond to data on all available MIDI channels.

Multi-timbral: an important synthesizer feature that allows simultaneous playback of several different sounds (patches).

Sound Modules or Expanders: MIDI devices which do not have keyboards.

Digital Sampling Keyboards: features digital recorded representations of sounds.

MIDI Sequencing Program: a program which provides all the features of a multi-track recording studio with the flexibility of digital control.

Quantization: an automatic correcting feature found on sequencing programs which synchronizes each note in prerecorded line of music, to the nearest selected value (i.e. quarter note, eighth note, etc.)

Serial/Baud Rate: MIDI utilizes a serial method of data transmission, sending at a rate of 32.25 kilobaud.

R.A.M.: stands for random access memory, which is utilized on computers and digital keyboards to store data.

Music Notation Program: a program which allows students to compose, edit, and print a piece of music.

Music Instructional Program: a program used to instruct students in a variety of different areas such as music theory, sight-reading, piano skills, and music composition.

On-board MIDI or Dedicated Hardware Sequencer: a sequencer which is built in to an electronic keyboard. Its operation does not require the use of software.

Music Sequencing

Music sequencing can properly be termed "word-processing for music". It is a form of multi-track recording that uses the computer memory instead of magnetic tape. Tracks can be recorded on top of each other, allowing the user to build a score of various instrument parts. The two methods of MIDI sequencing offered on the market are on-board (dedicated hardware or built in to a keyboard) and software driven (used with a microcomputer). Both of these methods have their advantages and limitations.

Dedicated hardware sequencers are generally easier to manipulate and are more portable. Many of the newer models of electronic keyboards are equipped with some kind of sequencer.

Software-based sequencers offer a large number of advantages. Among these are:

- Cheaper to produce.
- Easily updated.
- Graphic display of composition.
- Convenient storage and retrieval of data.
- Greater number of tracks.
- More editing functions.

When shopping for music sequencing software, the following suggestions should be considered:

1. If starting a MIDI network from scratch, purchase the software first. Then select the compatible hardware.
2. A hard disk drive is highly recommended for operating any music sequencing program.
3. Consider the application for which the sequencer will be used. If the sequencer is less important than for example a music notation program, an

integrated notation/sequencing program might be appropriate.

Music Notation Programs

MIDI Compatible music notation programs are also analogous to word-processing for printed music. These programs will allow the user to input from a keyboard, which generates a graphic representation of the notes on a computer screen and printing it out on any standard dot-matrix printer. Some programs will produce manuscripts of publishing quality if the software supports a laser printer. However, most programs allow the creation of complex musical scores that print exceptional manuscripts with standard printers. After entering the music, most programs feature a full range of editing commands such as tempo, dynamics, and text. A few of the notation programs will convert the MIDI data from a sequencing program to a printed score.

Because these programs are very powerful software packages, they usually require a great deal of memory to support their graphical environment. Some of the most recent notation programs include a built-in sequencer to allow the playback of the composition.

When shopping for MIDI compatible music notation software, the same suggestions apply as for purchasing sequencing software, with these additional suggestions.

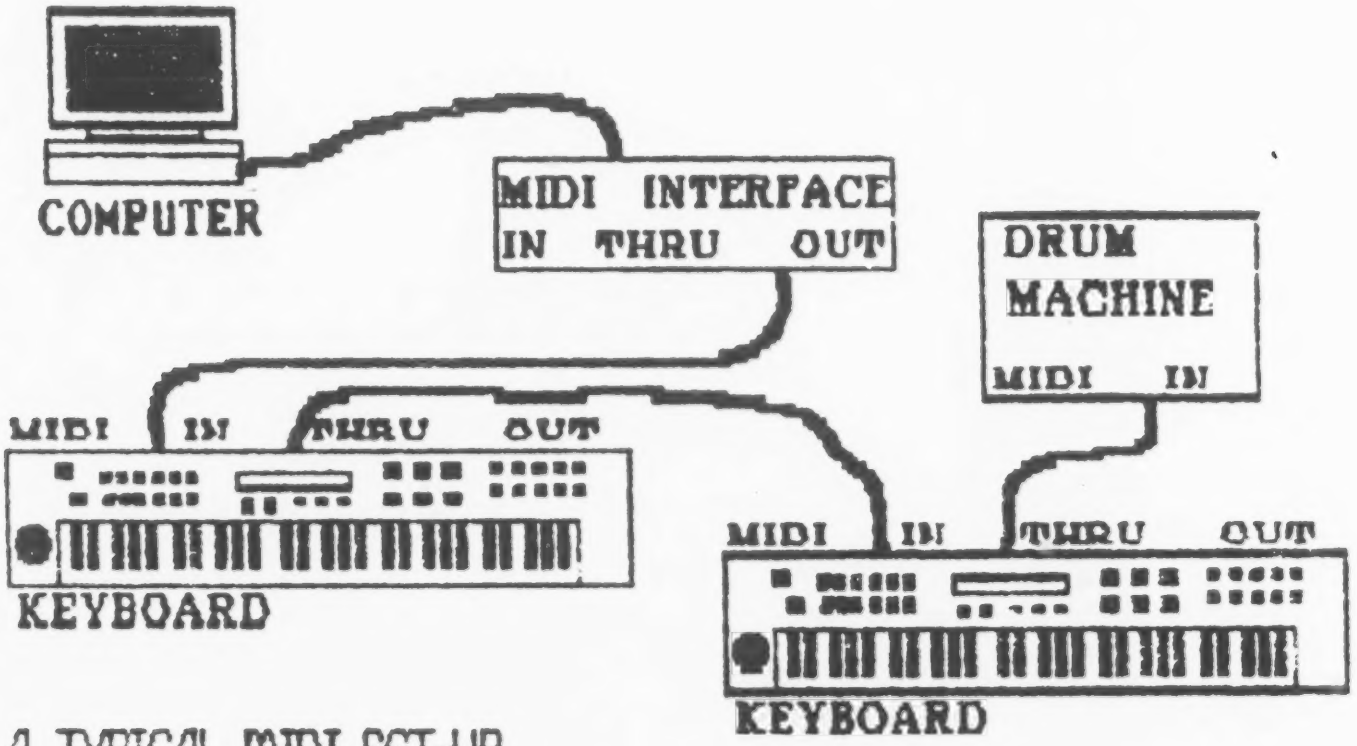
1. Make sure that the program includes the notation symbols needed for the application.
2. Make sure the program will operate on your printer.
3. Don't purchase without previewing (at least the demo) first. Some programs are very extensive and may not be appropriate for educators.

Music Instructional Software

Instructional music software is primarily used for teaching or reinforcing musical skills. Most programs engage students of all levels in a series of interactive games, drills, or simulations. With MIDI compatible programs, the interactivity between the student and computer is a musical one. These programs constitute the greatest share of the software market.

Suggestions for buying music instructional software include:

1. Preview before purchasing.
2. Make sure the proper disk size is specified when ordering.
3. Testing and record keeping features are recommended.



a TYPICAL MIDI SET-UP

APPENDIX L

SUMMARY OF RESULTS FROM POST-OBSEVATIONS

SUMMARY: POST-OBSERVATION RESULTS OF THE MIDI TECHNOLOGY OBSERVATION CHECKLIST

I. Evidence of the participants ability to select, match, and connect MIDI hardware with compatible software in a working configuration.

Number of Participants Completed	Not completed	
10	0	Appropriate MIDI interface installed in computer.
10	0	Computer and synthesizer connected.
10	0	Computer and appropriate software matched.
10	0	MIDI compatible software loaded on the computer.
10	0	Appropriate peripherals installed

II. Evidence of participants successfully performing the basic operations on music sequencing software.

Completed	Not completed	
10	0	Program successfully loaded.
10	0	Select tracks, voices, tempo, and meter.
10	0	Select MIDI instruments (channels).
10	0	Record a short sequence and save to disk.
10	0	Exit program.

III. Evidence of participants successfully performing the basic operations on music notation software.

Completed	Not completed	
10	0	Program successfully loaded.
10	0	Input notes from keyboard.
10	0	Build a score.
10	0	Print score from data disk.
10	0	Exit program.

IV. Evidence of participants successfully performing the basic operations on music instructional software.

Completed	Not completed	
10	0	Program successfully loaded.
10	0	Identify skills level.
10	0	Engage in drill, simulation, or tutorial.
10	0	Engage in testing or remediation.
10	0	Exit program.

APPENDIX M

SOFTWARE EVALUATION FORM

"Musical Stairs"
(Electronic Courseware Systems)

1. Hardware Requirements

2. Instructional Objective

3. Strategies

4. Comments

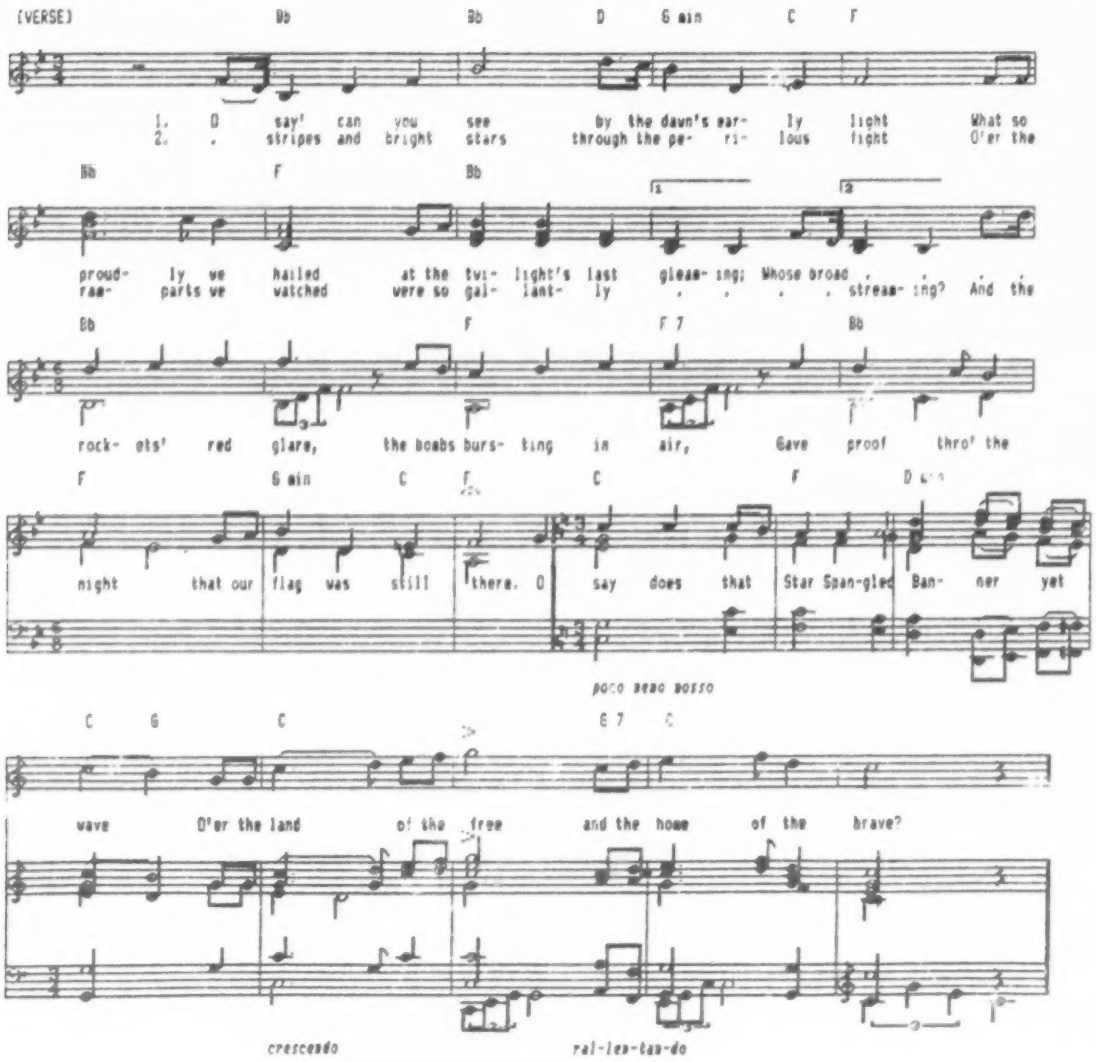
APPENDIX N

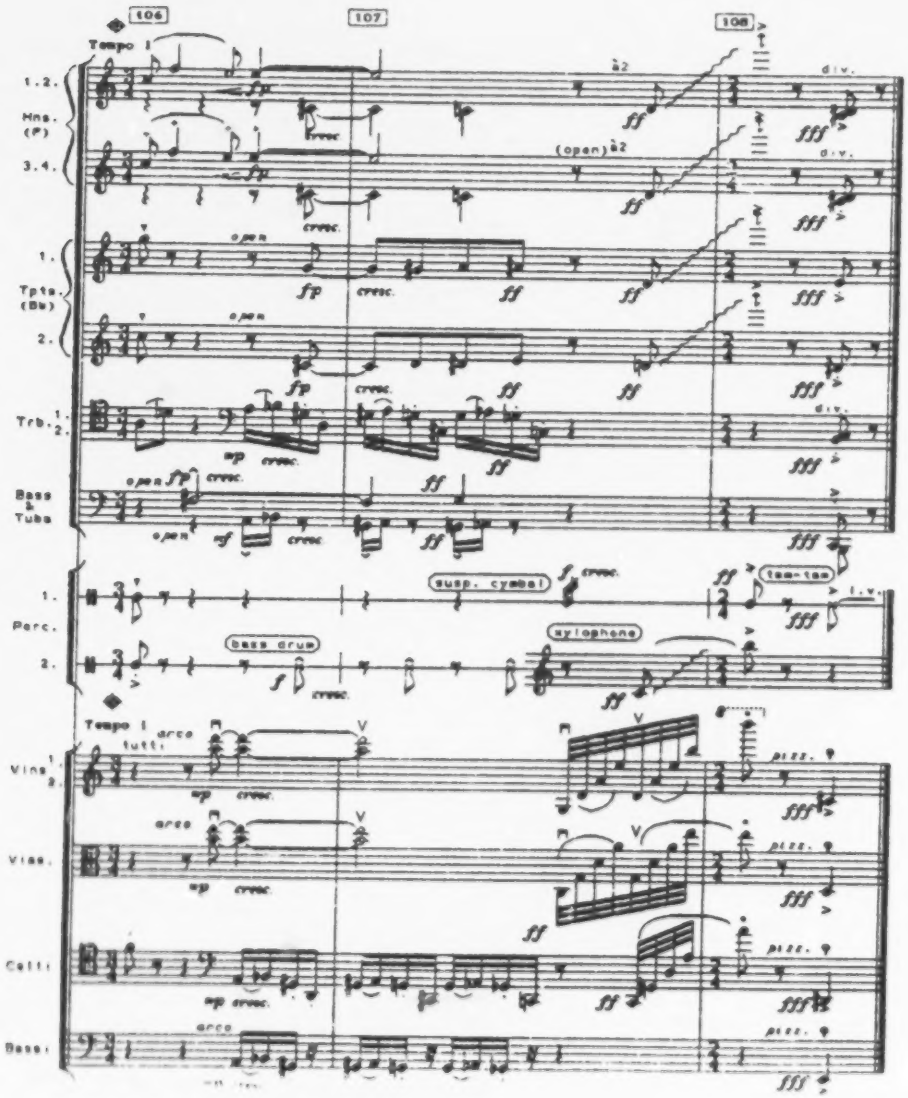
SAMPLES OF PRINTED MUSIC

Printed using "SongWright" by SongWright Software
(reduced approximately 20%)

The Star Spangled Banner

Francis Scott Key — J. Stafford Smith

♩ = 120 Con spirito

(VERSE)
Bb Bb D G min C F
1. O say' can you see by the dawn's ear- ly light What so
2. . stripes and bright stars through the pe- ri- lous fight O'er the
Bb F Bb
proud- ly we hailed at the twi- light's last gleam- ing; Whose broad , , , ,
ram- parts we watched were so gal- lant- ly . . . . stream- ing? And the
Bb F F 7 Bb
rock- ets' red glare, the bombs burs- ting in air, Gave proof thro' the
F G min C F C F D min
night that our flag was still there. O say does that Star Span-gled Ban- ner yet
poco meno mosso
C G C E 7 C
wave O'er the land of the free and the home of the brave?
crescendo
ral-len-tan-do

Printed using "Music Printer Plus" by Temporal Acuity
(reduced approximately 35%)

APPENDIX O

DISTRICT WORKSHOP EVALUATION FORM

Summary of the District Workshop Evaluation Form

Compent Title: MUSIC TECHNOLOGY 1.0

Instructor(s): Glen Neese

Completion Date: May 6, 1991

CODE:
A. STRONGLY AGREE
B. AGREE
C. DISAGREE
D. STRONGY DISAGREE
E. DOES NOT APPLY

PRESENTATION

1. THE OBJECTIVES WERE COMMUNICATED CLEARLY
2. THE METHODS WERE APPROPRIATE
3. THE MATERIALS WERE RELEVANT
4. THE LEARNING ACTIVITIES PERMITTED SUFFICIENT INVOLVEMENT TO ACHIEVE THE OBJECTIVES

(Responses: A: 10 B: 0 C: 0 D: 0 E:0)

ORGANIZATION

5. THE INSTRUCTOR(S) WERE WELL PREPARED
6. THE IN-SERVICE WAS WELL OGRANIZED AND MANAGED
7. THE INSTRUCTOR(S) FOLLOWED THE PLANS OUTLINED
8. THE TIME ALLOTTED FOR THIS ACTIVITY WAS APPROPRIATE

(Responses: A: 10 B: 0 C: 0 D: 0 E:0)

EFFECTIVENESS/USEFULNESS

9. KNOWLEDGE AND SKILLS LEARNED WILL BE USEFUL
10. I FEEL PREPARED TO APPLY WHAT I HAVE LEARNED

(Responses: A: 10 B: 0 C: 0 D: 0 E:0)

APPENDIX P

MUSIC TECHNOLOGY WORKSHOP EVALUATION FORM

MUSIC TECHNOLOGY WORKSHOP EVALUATION FORM

1. Please indicate briefly your opinion of the training sessions.

2. If the training sessions were helpful, please indicate why?

3. What ideas or activities should be included in the future?

APPENDIX Q

SUMMARY OF QUESTIONNAIRE RESPONSES

Summary of Participant Responses

MUSIC TECHNOLOGY WORKSHOP EVALUATION FORM

1. Please indicate briefly your opinion of the training sessions.

PARTICIPANT 1:
"I was particularly pleased with the hands-on approach to the inservice. We didn't spend a whole lot of time talking about MIDI, but rather went over enough basics to get started and went right to it."

PARTICIPANT 2:
"I liked being able to review the software first-hand. It's much more effective to see the actual program that to just read about it. Also enjoyed the interaction among other teachers."

PARTICIPANT 3:
"The training sessions for the MIDI workshop were well-planned, instructional and interesting. The instructor was both knowledgeable and entertaining. Many examples of MIDI hardware and software were made available for workshop use. My skills at these activities were greatly improved. The music notation software was of special interest tc me and I enjoyed it very much".

PARTICIPANT 4:
"Through the training sessions, I became more aware of what software was available and enjoyed the sessions."

PARTICIPANT 5:
"I enjoyed them. It was interesting and upbeat."

PARTICIPANT 6:
"The training sessions were well organized, focused, interesting, and informative. The instructor had an abundance of appropriate materials for us to review. His knowledge of music technology was also extensive enough to answer all our questions about MIDI hardware and software."

PARTICIPANT 7:
"Good hands-on activities."

PARTICIPANT 8:
"They were very informative and gave a lot of hands-on experience. I thought the visit to the music store was helpful in allowing us to see the latest in MIDI."

PARTICIPANT 9:
"Great first experience with MIDI. I thought the activities and materials were well organized and relevant to exploring this hi-tech area of music education."

PARTICIPANT 10:
"It was evident that much time, planning and organization was required to orchestrate this type of workshop. The atmosphere and hands-on learning activities were very conducive to learning about MIDI. The software products were very interesting and held great potential for the future of music education."

2. If the training sessions were helpful, please indicate why?

PARTICIPANT 1:
"The sessions were very helpful! I have read about a number of available programs for classroom use and are especially interested in tutorial applications and possibilities as well as notation/sequencing programs. The sessions gave me an opportunity to look at some of the available software programs-but not just by myself-with other teachers with additional input/feedback. After the sessions, I'm not so overwhelmed by the possibilities."

PARTICIPANT 2:
"(1) Made me feel less intimidated by all the new technology by seeing and doing some of the software. (2) I feel like I know more about what's out there in software for notation, sequencing, and instructional use. (3) More familiar with the terminology and (4) sparked a little more interest in learning about this technology."

PARTICIPANT 3:
"I felt that the training sessions for MIDI were very helpful since I knew very little about computer technology in this area. I was appreciative of the opportunity to learn about the music technology that is available. I enjoyed the hands-on experiences with the software. I can see where much of our available software would be useful for the school setting in that student's can be scored and that information can be stored for the teacher thus eliminating much paperwork."

PARTICIPANT 4:
"Although at the present I have limited access to a personal computer at my school, I have become more knowledgeable about the technological advancements of music hardware and software. I also improved my skills in the basic operations of MIDI compatible sequencing software."

PARTICIPANT 5:
"I learned many things about software for music, and types of equipment for music use."

PARTICIPANT 6:
"The sessions were very helpful because of the instruction in MIDI technology and had "hands on" experience with MIDI hardware and software. The instructor's advice on what to look for setting up a MIDI lab at our schools was invaluable."

PARTICIPANT 7:
"Brings teachers up to date on current hardware/software in the music industry."

PARTICIPANT 8:
"Because of the time for hands on experience, we were able to examine programs in depth."

PARTICIPANT 9:
"Provided a positive environment and a simplified approach for learning about what can be considered a complicated and confusing technology. Many of the misconceptions that I had about MIDI were clarified during the sessions."

PARTICIPANTS 10:
"The examination of these current programs along with the writing of goals and strategies, convinced me of the value of this technology."

3. What ideas of activities should be included in the future?

PARTICIPANT 1:
"These sessions were a rather broad overview. Maybe in the future we could look at some specifics. Just notation, just instructional, or just sequencing."

PARTICIPANT 2:
"More sequencing, more notation, more applications for large group instruction and/or small group. Also, sharing ideas and methods for technology in music classroom."

PARTICIPANT 3:
"An additional workshop on music sequencing would be very beneficial."

PARTICIPANT 4:
"I am very interested in a workshop in the near future which would further enable me to have hands-on experience with the synthesizer."

PARTICIPANT 5:
"More training in using music notation and sequencing."

PARTICIPANT 6:
"I would recommend the same kinds of activities because the technology progresses so rapidly that it's difficult to keep up with the innovations. It also takes more than one workshop to begin to feel comfortable with the technology."

PARTICIPANT 7:
"More in-depth treatment of MIDI and instructional strategies."

PARTICIPANT 8:
"We need more complete MIDI setups. Some of the computers had no MIDI interfaces or keyboards (musical) to work with. A tutorial on a particular program before the hands-on use would be helpful."

PARTICIPANT 9:
"More training and information on Integrative MIDI software such as Music Writer by Pyware and/or Music Printer Plus by Temporal Acuity. These programs are so involved that an entire workshop could be devoted to each one."

PARTICIPANT 10:
"More, More, More.
More in-depth training needs to be conducted in all three areas: MIDI sequencing, MIDI notation, and MIDI instructional. More teachers need to learn about this technology (needs to be required). And More funds need to be allocated by the district for MIDI interfaces, synthesizers, computers and software. After all educators need to get on the ball because kids have been bombarded with this (as a result of the media) and already know more about this technology than most music teachers."

APPENDIX R

FOLLOW-UP LETTER TO PARTICIPANTS

Follow-up letter to participants

May 8, 1991

Dear Jeff,

Thanks for attending the music technology workshop. I hope the meetings were as enjoyable for you as they were for me. The sharing of experiences within this talented and creative group of music teachers was certainly beneficial to all.

This was the first time that this particular kind workshop has been given and I apologize for those chaotic moments. I certainly hope this provided a starting point for your involvement in MIDI technology. Please remember that I will be will be happy to assist you in selecting or setting up your computer, software, or synthesizer.

I think you will agree that there were some excellent programs included in the workshop as well as some that were not appropriate for the classroom. Since MIDI sequencing (both software-based and hardware-based) seemed to be of interest to most, this is an area in which I will try to arrange additional workshops.

Again I would like to express my sincere thanks to you and everyone else for the perfect attendance at the training sessions and for your extra effort on completing the additional evaluation.

Sincerely,

Glen Neese